

NAME:

DATE:

## Unit-2 Mastery Assessment (version 642)

### Question 1 (10 points)

Let  $f$  represent a function. If  $f[15] = 7$ , then there exists a knowable solution to the equation below.

$$y = 8 \cdot f\left[\frac{x}{2} - 5\right] - 13$$

Find the solution.

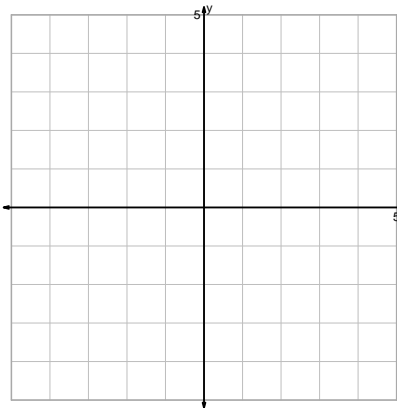
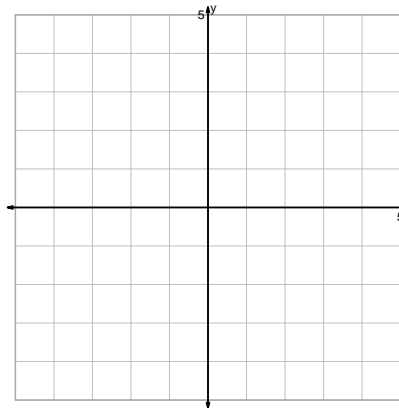
$$x =$$

$$y =$$

### Question 2 (20 points)

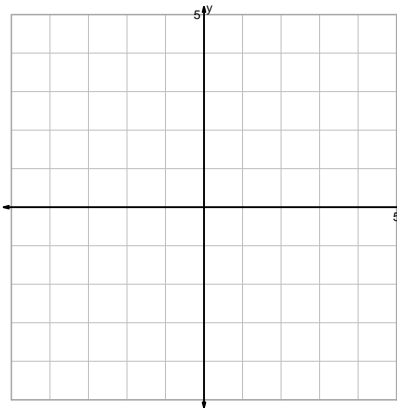
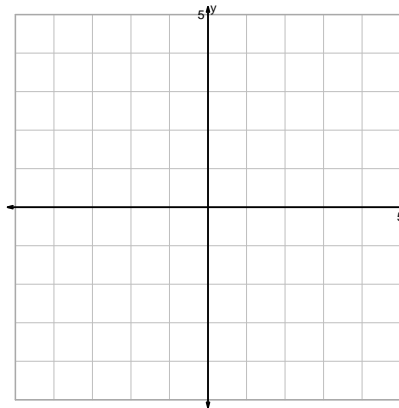
Graph the equations accurately. For each integer-integer point on the parent, indicate the corresponding point precisely. Also, with dashed lines, indicate any asymptotes.

$$y = \left(\frac{x}{2}\right)^2$$



$$y = \sqrt[3]{x} + 2$$

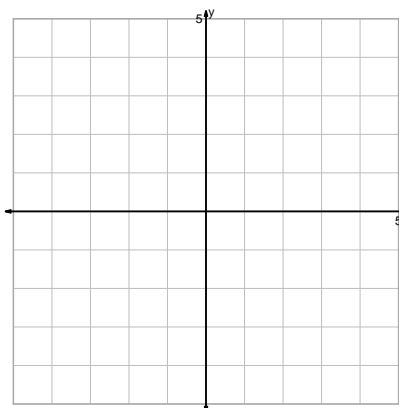
$$y = -\sqrt{x}$$



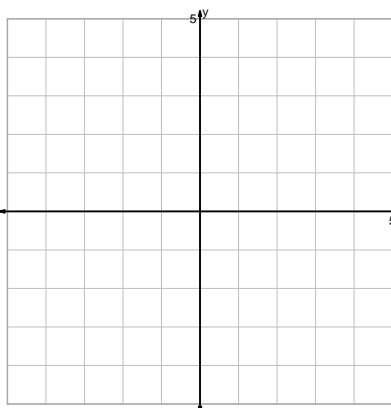
$$y = 2^x - 2$$

Question 2 continued...

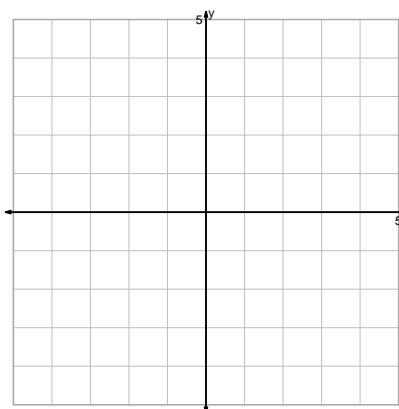
$$y = (x - 2)^3$$



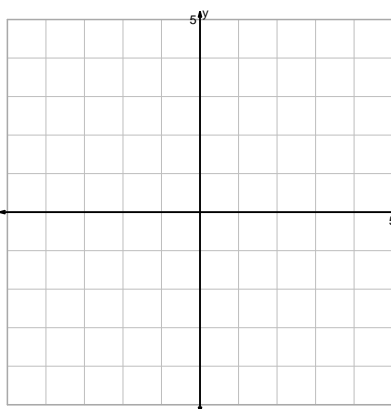
$$y = 2 \cdot \sqrt[3]{x}$$



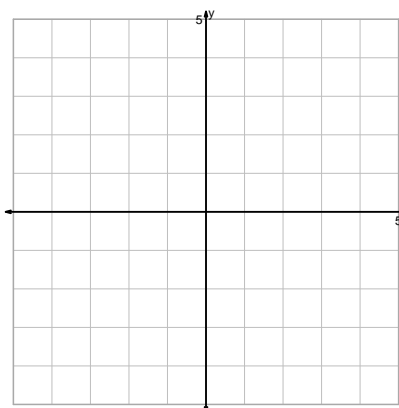
$$y = \log_2(2x)$$



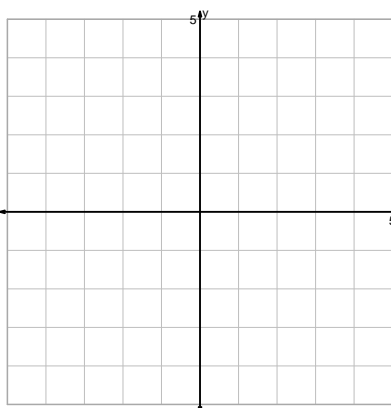
$$y = \frac{x^2}{2}$$



$$y = \sqrt{x + 2}$$

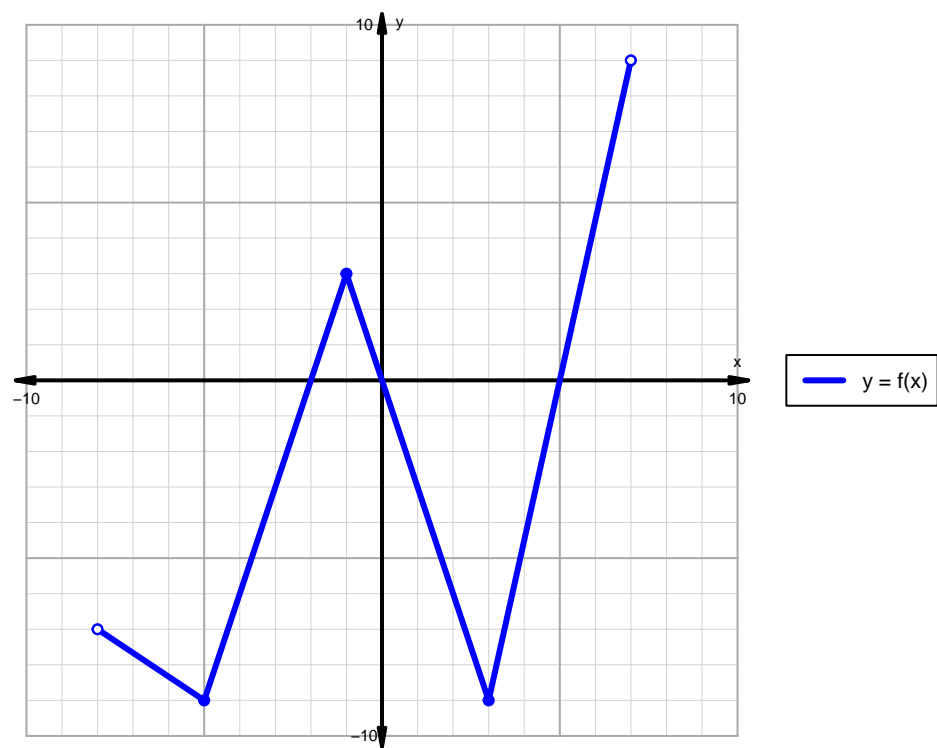


$$y = \log_2(-x)$$



Question 3 (20 points)

A function is graphed below.



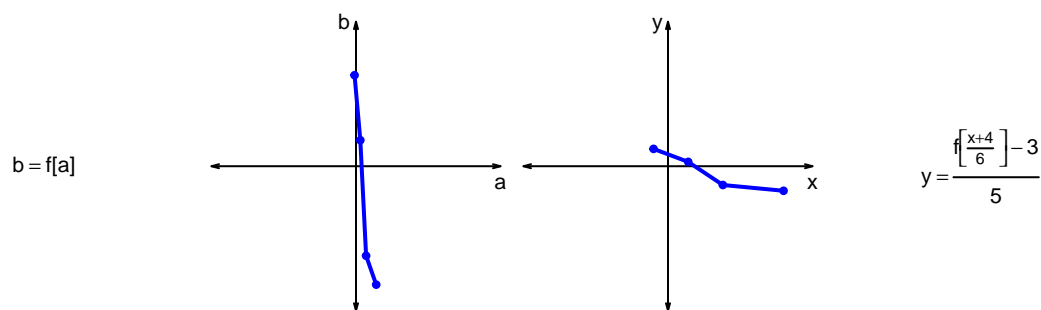
Indicate the following intervals using interval notation.

Feature	Where
Positive	
Negative	
Increasing	
Decreasing	
Domain	
Range	

**Question 4 (20 points)**

Let  $f$  represent a function. The curves  $b = f[a]$  and  $y = \frac{f\left[\frac{x+4}{6}\right]-3}{5}$  are represented below in a table and on graphs.

a	b	x	y
-1	63	-10	12
3	18	14	3
7	-62	38	-13
14	-82	80	-17



- a. Write formulas for calculating  $x$  from  $a$  and calculating  $y$  from  $b$ . (Or, write the coordinate transformation formula.)

- b. What geometric transformations (using words like translation, stretch, and shrink), and in what order, would transform the first curve  $y = f[x]$  into the second curve  $y = \frac{f\left[\frac{x+4}{6}\right]-3}{5}$ ?

### Question 5 (10 points)

A parent square-root function is transformed in the following ways:

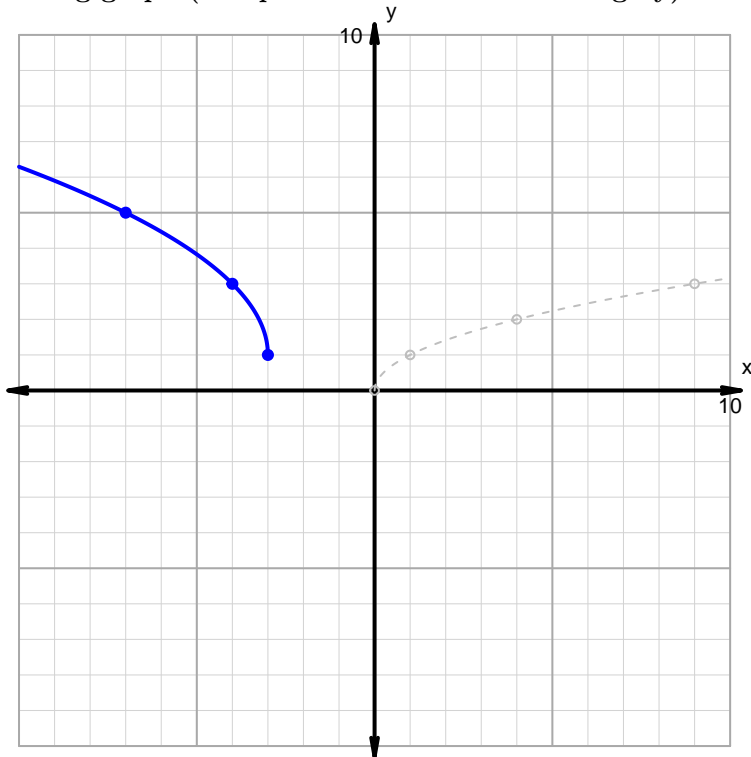
#### Horizontal transformations

1. Translate right by distance 3.
2. Horizontal reflection over  $y$  axis.

#### Vertical transformations

1. Vertical stretch by factor 2.
2. Translate up by distance 1.

Resulting graph (and parent function in dashed grey):

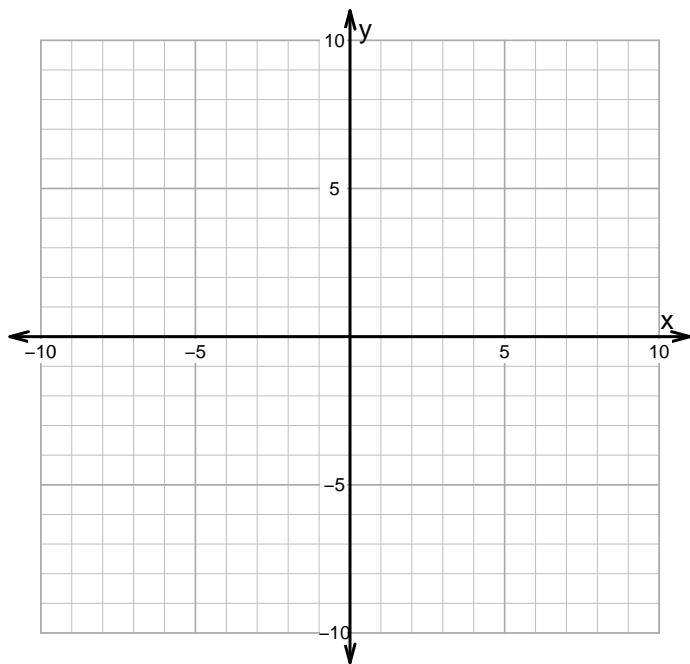


- What is the equation for the curve shown above?

**Question 6 (20 points)**

Make an accurate graph, and describe locations of features.

$$y = \frac{1}{3} \cdot |x + 6| - 1$$



Feature	Where
Domain	
Range	
Positive	
Negative	
Increasing	
Decreasing	